



RESIDUAL TUMOR BURDEN AFTER NEOADJUVANT CHEMOTHERAPY IN BREAST CANCER: A RETROSPECTIVE ANALYSIS STRATIFIED BY MOLECULAR SUBTYPE

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OBJECTIVE

To evaluate **residual cancer burden (RCB)** class distribution and **pathological downstaging** following neoadjuvant chemotherapy (NAC) in breast cancer patients, stratified by molecular subtype (HR+/HER2-, HER2+, and Triple Negative Breast Cancer [TNBC]).

METHODS

A retrospective analysis was conducted on **30 consecutive breast cancer cases** treated with NAC at Memon Medical Institute Hospital, Karachi, between October 2025 and June 2026. Molecular subtyping was performed using immunohistochemistry for ER, PR, and HER2.

RCB was classified as **RCB-0** (pathological complete response, pCR), **RCB-I** (minimal), **RCB-II** (moderate), or **RCB-III** (extensive residual disease). Pathological downstaging was assessed by comparing pre-treatment clinical TNM staging with post-operative pathological TNM staging.

Surgical procedures included **modified radical mastectomy (MRM)** in 93.3% and **breast-conserving surgery (BCS)** in 6.7% of cases.

RESULTS

Median patient age was **56 years** (range 30-72). Molecular subtype distribution was: HR+/HER2- (n=13, 43.3%), HER2+ (n=8, 26.7%), and TNBC (n=9, 30.0%).

The overall **pCR rate was 26.7% (8/30)**. TNBC demonstrated the highest pCR rate at **44.4% (4/9)**, followed by HER2+ at 25.0% (2/8), and HR+/HER2- at 15.4% (2/13). Extensive residual disease (RCB-III) was most prevalent in HR+/HER2- tumours (30.8%).

Overall RCB distribution was: RCB-0 in 26.7%, RCB-I in 10.0%, RCB-II in 36.7%, and RCB-III in 26.7% of cases.

Of 19 clinically node-positive patients, **52.6% (10/19)** achieved **nodal clearance** following NAC. Pathological nodal positivity was comparable across subtypes (HR+/HER2-: 46.2%; HER2+: 50.0%; TNBC: 44.4%). Median lymph nodes retrieved were 13.5 (IQR 9.25-15.0).

Fig 1. pCR rate by molecular subtype

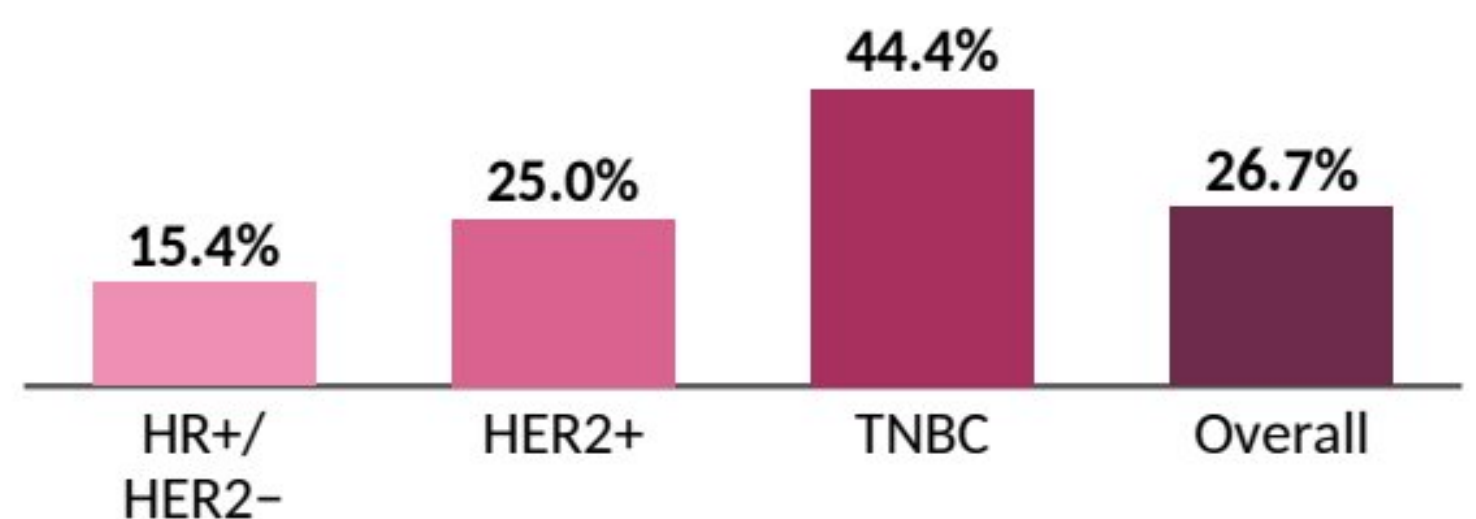
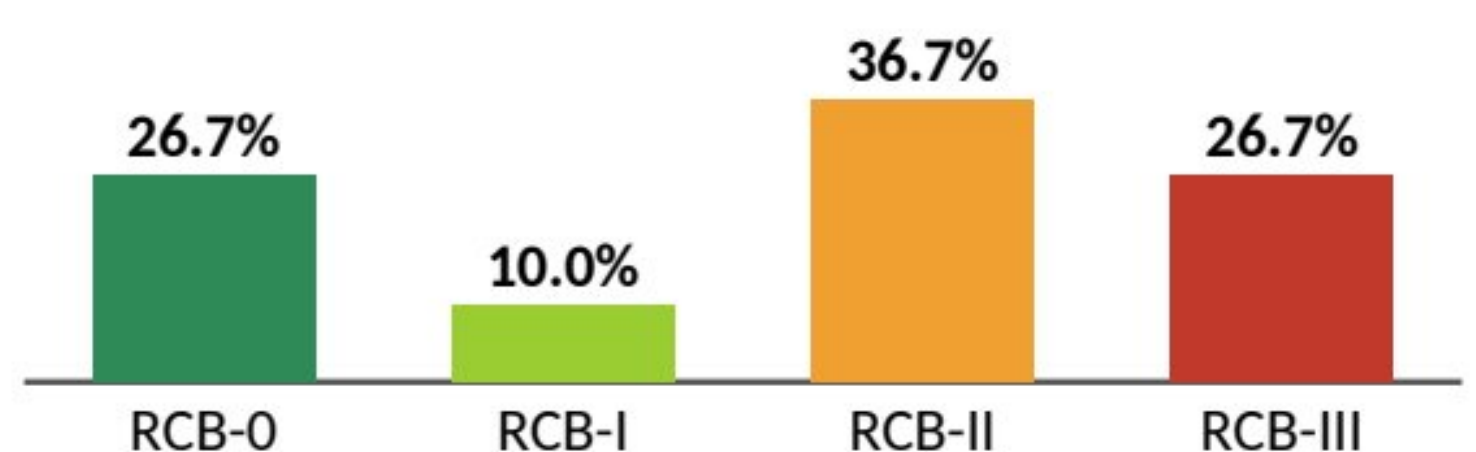


Fig 2. Overall RCB class distribution (n=30)



CONCLUSION

TNBC demonstrated superior chemosensitivity with the highest pCR rate, consistent with established literature, while HR+/HER2- tumours showed the greatest proportion of extensive residual disease. Over half of clinically node-positive patients achieved nodal clearance following NAC. These findings highlight the importance of subtype-tailored NAC strategies and escalated adjuvant therapy in cases of residual disease. Larger prospective studies are warranted to validate and expand upon these findings in the Pakistani patient population.